Guilherme Limberg
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🌐 Brazilian

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EDUCATION

2020–2024   Ph.D. in Astronomy – Universidade de São Paulo

with 12-month visiting period at University of Chicago
Advisor: Prof. Silvia Rossi
Thesis: The Chemodynamical Structure of the Ancient Galactic Halo

2016–2019   B.Sc. in Astronomy – Universidade de São Paulo

Advisor: Prof. Silvia Rossi
Final term work: Spectroscopy of Metal-poor Star Candidates with SOAR/Goodman (PT-BR)

2015–interrupted   B.Sc. in Chemical Engineering – Universidade de São Paulo

2010–2013   Mechanical Technician – Instituto Federal de São Paulo

AWARDS AND FUNDING

2022–2023   Research Internship Abroad at University of Chicago – FAPESP

Local supervisor: Prof. Alex P. Ji
Total: 30,360 USD (FAPESP) + 30,720 BRL (Brazilian reais, FAPESP) + 7,480 USD (UChicago)

2022–2024   Doctorate – FAPESP – IAG/USP

2020   Award – Best Ongoing PhD Presentation – V IAG Science Day

2020–2022   Doctorate – CAPES – IAG/USP

2018–2019   Undergraduate Research – PIBIC/CNPq – IAG/USP

Project: Classification of r-process Enhanced Stars
Total: 4,800 BRL

QUANTITATIVE INDICATORS

Total number of refereed papers: 13+7 submitted
Citations: 180 | h-index: 7 | NASA/ADS
1st author: 5+1 | Nth author: 8+6
See the list of publications for details.

SKILLS

Languages   Portuguese (native), English (fluent), Spanish (intermediate), German (basic), French (basic)

Programming   Languages: Python (main), R-project
Packages: pandas, matplotlib, scikit-learn, scipy, numpy, astropy, emcee, corner, ggplot2

Other resources   IRAF/DRAGONS/CarPy (data reduction), TOPCAT (large data sets), AGAMA/galpy/Gala (dynamics), smhr/LESSPayne/MOOG (spectroscopy)

Surveys   Gaia, APOGEE, GALAH, SDSS/SEGUE, LAMOST, 2MASS, WISE, S/J-PLUS

COLLABORATION MEMBERSHIP

Member: Southern Stellar Stream Spectroscopic Survey (S^5)

Member: DECam Local Volume Exploration Survey (DELVE)

Member: Mapping the Ancient Galaxy in CaHK (MAGIC)

Member: Southern Photometric Local Universe Survey (S-PLUS)

LEADERSHIP AND SERVICE

Refereeing: MNRAS

2022– **Organizer:** Cycle of Seminars of the Astronomy Department of IAG/USP ([YouTube](#))

2021– **Organizer:** Milky Way Brazilian weekly group meeting

2022–2023 **Students representative:** Astronomy Department Council (IAG/USP)

2022–2023 **Students representative:** Astronomy Graduate Committee (IAG/USP)

2021–2022 **Students representative:** Research Committee (IAG/USP)

2021 **Organizer (LOC):** VI IAG Science Day

2019– **Member:** Sociedade Astronômica Brasileira (SAB)

TEACHING

2023–2024 **Supervision:** undergraduate research project
Co-supervising, alongside Prof. Silvia Rossi and Dr. Hélio Perottoni, the undergraduate research project of student João V. N. dos Santos, entitled "The metallicity distribution function of the Typhon stellar stream".

2021 **Supervision:** undergraduate thesis work
Co-supervised, alongside Prof. Silvia Rossi, the undergraduate thesis work of student Fernanda Nogueira, entitled "[The Population of Accreted Globular Clusters of the Milky Way](#)" (PT-BR).

2021/1 **Teaching assistant:** Introduction to Astronomy I
All materials I produced can be found in this [Google Drive](#). I also developed Python codes for the students to interact with MESA stellar evolution models (via [Google Colab](#)).

2019/2 **Teaching assistant:** Fundamental Astronomy

2018–2019 **Physics Teacher:** [Cursinho da FEA](#)
Physics teacher at "Cursinho da FEA", a social project by Economics, Business Administration, and Accountancy undergraduates of USP providing education focused on entrance exams for public universities to high-school students in situation of socioeconomic vulnerability.

2016–2019 **Physics Teacher:** [Cursinho Popular da Poli USP](#)
Physics teacher at "Cursinho Popular da Poli USP", a social project by Engineering undergraduates of USP providing education focused on entrance exams for public universities to high-school students in situation of socioeconomic vulnerability.

PRESENTATIONS

2023
Santiago/Chile
METALS 2023: Metal Production and Distribution in a Hierarchical Universe
Talk | Observations of a Dwarf-galaxy Stellar Stream Reveal the Rise of the r-process

2023
Chicago/USA
KICP Near-field Cosmology Group Meetings (invited)
Talk | Chemodynamical Properties of Wukong Dwarf-galaxy Stellar Stream

2023
Princeton/USA

Princeton Astro Galread discussion group
Talk | Detailed Abundances of the Dwarf-galaxy Stellar Stream Wukong/LMS-1

2023
Ann Arbor/USA

Great Lakes Clusters and Streams
Talk | Accreted globular clusters

2023
New York/USA

Galactic Frontiers: Dwarf Galaxies in the Local Volume and Beyond
Talk | Detailed Abundances of Wukong/LMS-1 Dwarf-galaxy Stellar Stream

2023
Chicago/USA

Workshop on Stellar Properties from NLTE Radiative Transfer
Talk | Chemical Abundances of the Disrupted Dwarf-galaxy Stream Wukong in 1D LTE

2023
East Lansing/USA

CeNAM Frontiers in Nuclear Astrophysics Meeting
Talk | Abundance Patterns of the Dwarf-galaxy Stream Wukong, a.k.a. LMS-1

2023
Pasadena/USA

Carnegie Observatories Lunch Talk Seminar Series (invited)
Talk | The Origin of the Metallicity Gradient in Sagittarius Stellar Stream (YouTube)

2023
Virtual

S-PLUS Collaboration Biweekly Meetings (invited)
Talk | The Origin of Stellar-population Variations in Sagittarius Stream Revealed by S-PLUS

2023
Chicago/USA

KICP Near-field Cosmology Group Meetings (invited)
Talk | The Life and Death of Sagittarius Dwarf Spheroidal Galaxy

2022
Virtual

3rd S-PLUS Mini-workshop: Galactic Structure (invited)
Talk | Galactic Archaeology with S-PLUS and $Gaia$: News on Stellar Streams and Dwarf Galaxies

2022
Tucson/USA

FLASH: Lunch Astrophysics Seminar Hour at NOIRLab Headquarters (invited)
Talk | Footprints of the Milky Way's Last Major Merger

2022
São Caetano do Sul/Brazil

SPAnet Workshop on Artificial Intelligence in Astronomy
Talk | Using Unsupervised Clustering to Unveil the Fine-grained Structure of the Galactic Halo

2022
Virtual

XLV Meeting of the Sociedade Astronômica Brasileira
Talk | Phase-space Morphology and Chemistry of the Sagittarius Stellar Stream

2022
Rio de Janeiro/Brazil

17th S-PLUS Collaboration Meeting
Talk | Dwarf Galaxies Galore: Disrupted and Intact Milky Way Satellites in S-PLUS

2022
Virtual

Cycle of Seminars of the Astronomy Department of IAG/USP (invited)
Talk | Reconstructing an Ancient Dwarf Galaxy with Stars and Globular Clusters (YouTube)

2021
Virtual

VI IAG Science Day
Talk | Dwarf Galaxies of the Past Revealed With Nearby Stars (YouTube)

2021
Virtual

XLIV Meeting of the Sociedade Astronômica Brasileira
Talk | Fragments of Ancient Dwarf Galaxies

2021
Virtual

GALAH Science Meeting
Talk | Fragments of an Ancient Dwarf Galaxy (YouTube)

2021
Virtual

15th S-PLUS Collaboration Meeting
Talk | Chemodynamical Studies of the Galaxy with S-PLUS and $Gaia$

2021
Virtual

Seminar at Nicolaus Copernicus Astronomical Center (invited)
Talk | Dynamically Tagged Groups of Very Metal-poor Halo Stars

2020
Virtual

V IAG Science Day
Talk | Ancient Stars in the Galaxy (YouTube)

2019
São Paulo/Brazil

IV IAG Science Day
Talk | Looking for Metal-poor Stars

2019
São Paulo/Brazil

XLIII Meeting of the Sociedade Astronômica Brasileira
Poster | Classification of r-Process Enhanced Stars

2019 *São Paulo/Brazil*	**XLIII Meeting of the Sociedade Astronômica Brasileira** Poster | Spectroscopy of Metal-poor Star Candidates with SOAR/Goodman

TELESCOPE ALLOCATION

2023A *PI*	**Gemini South – GMOS (26.5h)** Spectroscopic Confirmation of Extremely Metal-poor Stars from Gaia DR3 – GS-2023B-Q-107 (22h US) + GS-2023B-Q-309 (4.5h BR)
2023B–2026A (survey) *Co-I*	**Blanco – DECam (54 nights)** The DECam MAGIC Survey: Mapping the Ancient Galaxy in CaHK – 2023B-646244
2023A *PI*	**Gemini South – GMOS (42.0h)** Spectroscopic Confirmation of Extremely Metal-poor Star Candidates from Gaia DR3 – GS-2023A-Q-412
2023A *PI*	**Gemini North – GRACES (14.0h)** Testing the Revived Star Formation Scenario in an Outer Halo Stellar Stream – GN-2023A-Q-208
2022B *Co-I*	**SOAR – Goodman (40.0h)** Finding the Brightest Very Metal-poor Stars in the Galaxy – SO-2022B-002
2022B *PI*	**Gemini North – GRACES (11.4h)** The Brightest Extremely Metal-poor Stars in the Northern Sky – GN-2022B-Q-211
2022A *Co-I*	**Gemini North – GRACES (14.4h)** Unraveling the Accreted Origin of a Stellar Overdensity – GN-2022A-Q-114 + GN-2022A-Q-209
2022A *Co-I*	**SOAR – Goodman (8.0h)** Abundance Variations and Radial Differences Between the Two Populations of the Globular Cluster NGC7089 – SO-2022A-001
2022A *Co-I*	**SOAR – Goodman (40.0h)** Finding the Brightest Very Metal-poor Stars in the Galaxy – SO-2022A-006
2021B *PI*	**Gemini North – GRACES (2.3h)** The Brightest Ultra Metal-poor Star – GN-2021B-FT-116
2021B *PI*	**Gemini North – GRACES (9.7h)** The Chemodynamical Structure of the Ancient Galactic Halo – GN-2021B-Q-111
2021B *Co-I*	**SOAR – Goodman (40.0h)** Finding the Best Very Metal-poor Stars in the Galaxy – SO-2021B-006
2021A *PI*	**Gemini North – GRACES (2.2h)** The Chemical-abundance Pattern of a Long-vanished Dwarf Galaxy – GN-2021A-FT-209
2021A *PI*	**Gemini North – GRACES (3.0h)** Ancient Stars in the Galactic Disk – GN-2021A-FT-205
2021A *Co-I*	**SOAR – Goodman (40.0h)** Finding the Best Very Metal-poor Stars in the Galaxy – SO-2021A-007
2021A *PI*	**Gemini North – GRACES (14.2h)** The Chemodynamical Structure of the Ancient Galactic Halo – GN-2021A-Q-111
2020B *Co-I*	**SOAR – Goodman (20.0h)** Finding the Best Very Metal-poor Stars in the Galaxy – SO-2020B-008

1st AUTHOR PUBLICATIONS

Submitted *MNRAS*	**Extending the Chemical Reach of the H3 Survey: Detailed Abundances of the Dwarf-galaxy Stellar Stream Wukong/LMS-1** **Limberg, G.**; Ji, A. P.; Naidu, R. P.; Chiti, A.; Rossi, S.; Usman, S. A.; Ting, Y. S.; Zaritsky, D.; Bonaca, A.; Borbolato, L.; Speagle, J. S.; Chandra, V.; Conroy, C.. (NASA/ADS)
2023 *ApJ*	**Phase-space Properties and Chemistry of the Sagittarius Stellar Stream Down to the Extremely Metal-poor ($[Fe/H] < -3.0$) Regime** **Limberg, G.**; Queiroz, A. B. A.; Perottoni, H. D.; Rossi, S.; Amarante, J. A. S.; Chiappini, C.; Santucci, R. M.; Pérez-Villegas, A.; Lee, Y. S. (NASA/ADS)
2022 *ApJ*	**Reconstructing the Disrupted Dwarf Galaxy $Gaia$-Sausage/Enceladus Using its Stars and Globular Clusters** **Limberg, G.**; Souza, S. O.; Pérez-Villegas, A.; Rossi, S.; Perottoni, H. D.; Santucci, R. M. (NASA/ADS)
2021 *ApJL*	**Abundance Patterns of α and Neutron-capture Elements in the Helmi Stream** **Limberg, G.**; Santucci, R. M.; Rossi, S.; Queiroz, A. B. A.; Chiappini, C.; Souza, S. O.; Perottoni, H. D.; Pérez-Villegas, A.; Barbosa, F. O. (NASA/ADS)
2021 *ApJ*	**Targeting Bright Metal-poor Stars in the Disk and Halo Systems of the Galaxy** **Limberg, G.**; Santucci, R. M.; Rossi, S.; Shank, D.; Placco, V. M.; Beers, T. C.; Schlaufman, K. C.; Casey, A. R.; Perottoni, H. D.; Lee, Y. S. (NASA/ADS)
2021 *ApJ*	**Dynamically Tagged Groups of Very Metal-poor Halo Stars from the HK and Hamburg/ESO Surveys** **Limberg, G.**; Rossi, S.; Beers, T. C.; Perottoni, H. D.; Pérez-Villegas, A.; Santucci, R. M.; Abuchaim, Y.; Placco, V. M.; Lee, Y. S.; Christlieb, N.; Norris, J. E.; Bessell, M. S.; Ryan, S. G.; Wilhelm, R.; Rhee, J.; Frebel, A. (NASA/ADS)

Nth AUTHOR PUBLICATIONS

Submitted *ApJS*	**S-PLUS: Photometric Re-calibration with the Stellar Color Regression Method and an Improved Gaia XP Synthetic Photometry Method** Xiao, K.; Huang, Y.; Yuan, H.; Beers, T. C.; Huang, B.; Xu, S.; Yang, L.; Almeida-Fernandes, F.; Perottoni, H. D.; **Limberg, G.**; Schoenell, W.; Ribeiro, T.; Kanaan, A.; Gomes de Olivira N.. (NASA/ADS)
Submitted *MNRAS*	**A Dark Siren Measurement of the Hubble Constant Using Gravitational Wave Events from the First Three LIGO/Virgo Observing Runs and DELVE** Alfradique, V.; Bom, C. R.; Palmese, A.; Teixeira, G.; Santana-Silva, L.; Drlica-Wagner, A.; Riley, A. H.; Martínez-Vázquez, C. E.; Sand, D. J.; Stringfellow, G. S.; Medina, G. E.; **Limberg, G.**; Wu, J. F.; Pace, A. B.; Carballo-Bello, J. A.; Choi Y..
Submitted *MNRAS*	**Multiple Populations and a CH Star Found in 300S Globular Cluster Stellar Stream** Usman, S. A.; Ji, A. P.; Li, T. S.; Pace, A. B.; Cullinane, L. S.; Da Costa, G. S.; Koposov, S. E.; Lewis, G. F.; Zucker, D. B.; Belokurov, V.; Bland-Hawthorn, J.; Ferguson, P. S.; Hansen, T. T.; **Limberg, G.**; Martell, S. L.; McKenzie, M.; Simon, J. D..
Submitted *Nature*	**Signatures of Extragalactic First Stars in the Large Magellanic Cloud** Chiti, A.; Mardini, M.; **Limberg, G.**; Frebel, A.; Ji, A. P.; Reggiani, H.; Ferguson P.; Andales, H. D.; Brauer, K.; Li, T. S.; Simon, J. D..
In press *ApJ*	**All-sky Kinematics and Chemistry of Monoceros Stellar Overdensity** Borbolato, L.; Perottoni, H. D.; Rossi, S.; **Limberg, G.**; Pérez-Villegas, A.; Antoja, T.; Anders, F.; Laporte, C. F. P.; Rocha-Pinto, H. J.; Santucci, R. M.. (NASA/ADS)
Submitted *MNRAS*	**Ages and Metallicities of Stellar Clusters Using S-PLUS Narrow-band Integrated Photometry: the Small Magellanic Cloud** Fabiano de Souza, G.; Westera, P.; Almeida-Fernandes, F.; **Limberg, G.**; Dias, B.; Hernandez-Jimenez, J. A.; Herpich, F. R.; Kerber, L. O.; Perottoni, H. D.; Guerço, R.; Machado Pereira, E.; Li, L.; Sampedro, L.; Kanaan, A.; Ribeiro, T.; Schoenell, W.; Mendes de Oliveira, C..
Submitted *MNRAS*	**200,000 Candidate Very Metal-poor Stars in Gaia DR3 XP Spectra** Yao, Y.; Ji, A. P.; Koposov, S.; **Limberg, G.**. (NASA/ADS)

2023
MNRAS

Chemodynamical Properties and Ages of Metal-poor Stars in S-PLUS

Almeida-Fernandes, F.; S-PLUS Collaboration (incl. **Limberg, G.**). ([NASA/ADS](#))

2023
ApJ

The Chemodynamical Nature of the Triangulum-Andromeda Overdensity

Abuchaim, Y.; Perottoni, H. D.; Rossi, S.; **Limberg, G.**; Pérez-Villegas, A.; Santucci, R. M.; Placco, V. M.; Sales-Silva, J. V.; Anders, F.; Rocha-Pinto, H. J. ([NASA/ADS](#))

2022
ApJ

The SDSS−$Gaia$ View of the Color−Absolute Magnitude Relation for Blue Horizontal-Branch Stars

Barbosa, F. O.; Santucci, R. M.; Rossi, S.; **Limberg, G.**; Perottoni, H. D.; Pérez-Villegas, A. ([NASA/ADS](#))

2022
ApJL

The Unmixed Debris of $Gaia$-Sausage/Enceladus in the Form of a Pair of Halo Stellar Overdensities

Perottoni, H. D.; **Limberg, G.**; Amarante, J. A. S.; Rossi, S.; Queiroz, A. B. A.; Santucci, R. M.; Pérez-Villegas, A.; Chiappini, C. ([NASA/ADS](#))

2022
ApJ

Dynamically Tagged Groups of Metal-poor Stars from the Best and Brightest Survey

Shank, D.; Beers, T. C.; Placco, V. M.; **Limberg, G.**; Jaques, E.; Yuan, Z.; Schlaufman, K. C.; Casey, A. R.; Huang, Y.; Lee, Y. S.; Hattori, K.; Santucci, R. M. ([NASA/ADS](#))

2021
ApJL

Searching for Extragalactic Exoplanetary Systems: The Curious Case of BD+20 2457

Perottoni, H. D.; Amarante, J. A. S.; **Limberg, G.**; Rocha-Pinto, H. J.; Rossi, S.; Anders, F.; Borbolato, L. ([NASA/ADS](#))

2021
ApJ

The R-Process Alliance: Chemodynamically Tagged Groups of Halo r-process-enhanced Stars Reveal a Shared Chemical-evolution History

Gudin, D.; Shank, D.; Beers, T. C.; Yuan, Z.; **Limberg, G.**; Roederer, I. U.; Placco, V. M.; Holmbeck, E. M.; Dietz, S.; Rasmussen, K. C.; Hansen, T. T.; Sakari, C. M.; Ezzeddine, R.; Frebel, A. ([NASA/ADS](#))